

fact that a protostelic genus *Lygodium* occurs among the living Schizaeaceae, throws no light on the morphological nature of the pith in the central cylinder of the other schizaeaceous genera *Schizaea*, *Aneimia*, and *Mohria*.—E. C. JEFFREY.

Mitosis in *Cynomorium*.—BACCARINI¹⁶ has published an account of vegetative mitosis in *Cynomorium coccineum* (Balanophoraceae). From a study of the nucleus in meristem of the roots and in parenchyma of the stem, he finds the following stages: (1) *Prophase*: (a) chromatin granules are uniformly distributed throughout the fundamental mass of the nucleus, with or without still larger chromatin knots or joints, the chromocenters; (b) the chromatic granules, separating from the faintly staining fundamental mass of the nucleus, aggregate gradually into a distinct number of larger masses, the chromocenters; (c) these chromocenters unite to form larger masses, more compact and lengthened, which constitute the prochromosomes; (d) some prochromosomes fuse together by their ends into a chain, which finally results in filaments of the spirem; the spirem by this time is homogeneous in structure, but it is uncertain whether it is a single continuous thread; (e) the filaments of the spirem segment into a definite number of chromosomes, which seem to be more numerous than the prochromosomes. (2) *Metaphase*: The chromosomes become arranged in the equatorial plate, where they divide and the daughter chromosomes separate. (3) *Anaphase*: The chromosomes accumulate in a convergent bundle at the pole. (4) *Telophase*: The chromosomes dissolve and form the fundamental nuclear mass with its chromatin granules.—SHIGÉO YAMANOUCHI.

Riella.—In the twelfth of the *Archegoniatienstudien*, which he announces to be the last, so far at least as concerns the liverworts, GOEBEL describes the brood buds of *Riella helicophylla*, *R. cossoniana*, and *R. Battandieri*.¹⁷ These organs were first found by UNDERWOOD and HOWE in *R. americana*, and have not yet been observed in *R. Clausonis*. They consist of an unequally two-lobed disk attached by a single stalk cell somewhat excentrically placed on the upper surface. GOEBEL holds these gemmae to be "modified slime papillae," as in *Marchantia*, an effort at homologizing which seems to us strained. The smaller lobe is loaded with food and therefore heavier; so the gemma sinks in the water with this end down and from it rhizoids arise. The larger lobe, which he calls the germ disk, grows, and especially the meristematic tissue between the two, parting them by a rather long stalk. From the germ disk two plants are produced directly when well nourished, and otherwise one indirectly, that is, only after proliferation of the germ disk. GOEBEL also discusses the systematic position of the genus, concluding on rather doubtful grounds, it seems, that it should

¹⁶ BACCARINI, P., Sulle cinesi vegetative del *Cynomorium coccineum* L. Nuovo Giorn. Bot. Ital. 15:189-203. pl. 7. 1 08.

¹⁷ GOEBEL, K., Archegoniatienstudien. XII. Ueber die Brutknospenbildung und über die systematische Stellung von *Riella*. Flora 98:308-323. figs. II. 1908.